

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
30 June 2005 (30.06.2005)

PCT

(10) International Publication Number  
**WO 2005/058466 A1**

(51) International Patent Classification<sup>7</sup>: **B01F 3/04**

(21) International Application Number:  
PCT/FI2004/000767

(22) International Filing Date:  
16 December 2004 (16.12.2004)

(25) Filing Language: Swedish

(26) Publication Language: English

(30) Priority Data:  
0303390-9 17 December 2003 (17.12.2003) SE

(71) Applicant (for all designated States except US): **OUTOKUMPU OYJ [FI/FI]; Riihitontuntie 7, FIN-02200 Espoo (FI).**

(72) Inventors; and

(75) Inventors/Applicants (for US only): **JOHANSSON, Robert [SE/SE]; Skidstigen 13, S-931 51 Skellefteå (SE). LUNDGREN, Yngve [SE/SE]; Bladgatan 152, S-931 58 Skellefteå (SE). MARKLUND, Sam [SE/SE]; Ö. Grubbogatan 10, S-931 64 Skellefteå (SE).**

(74) Agent: **OUTOKUMPU OYJ, INTELLECTUAL PROPERTY MANAGEMENT; P.O.Box 27, FIN-02201 Espoo (FI).**

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

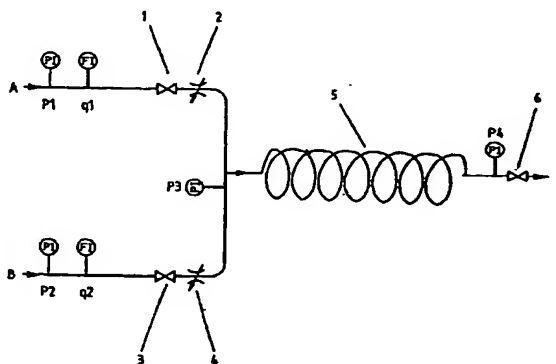
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS,

[Continued on next page]

(54) Title: A METHOD FOR THE ABSORPTION OF A GAS IN A LIQUID AND AN APPARATUS FOR THIS



(57) Abstract: A process for producing a solution of a gas in a liquid in which the gas is soluble, the solution having a predetermined concentration up to saturation. The gas and the liquid are brought together under controlled supply in a proportion corresponding to the predetermined concentration of the solution, and the gas and the liquid are caused to form a stream passing through a common conduit. The gas and the liquid in the stream are caused to intermix under the action of gravity, and the intermixing is repeated before the gas and the liquid have separated, so that the gas is substantially absorbed in the liquid, forming a gas-liquid solution of the predetermined concentration. The stream may be brought into turbulence for intensifying the intermixing of the gas and the liquid. An apparatus for performing the process comprises a conduit including a continuous tubular coil formed with a plurality of upwardly and downwardly directed sections. Suitably, elements generating turbulence are disposed within the tubular coil, as is also a pressure-sustaining valve which maintains a predetermined overpressure in the conduit is provided. Suitably, the tubular coil is shaped as a horizontal helix.

WO 2005/058466 A1



JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- of inventorship (Rule 4.17(iv)) for US only

**Published:**

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.